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$$720720x+1=17y,\quad y=42395x+(5x+1)/17.$$

Let $(5x+1)/17=m$, an integer.

$\therefore\ x=(17m-1)/5$.

Make $m=3$, then $x=10$. The required number is $(10)720720+1=7207210$.

Solved in a similar manner of *L. M. COFFIN*, University of Maine, Orono, Me.; *J. CHAS. RATHBUN*, Student State University of Washington, Seattle, Wash.; and *G. B. M. ZERR.*

II. Solution by M. A. GRUBER, A. M., War Department, Washington, D. C.

The problem may be generally stated: $an\div 2,\ 3,\ 4,\ 5,\ \ldots.(a-1)$, respectively, gives a remainder of 1; where a=any prime odd number.

Let M=least common multiple of 2, 3, 4, 5, ... $(a-1)$.

Then $an=Mm+1$, and $n=\dfrac{Mm+1}{a}=Qm+\dfrac{dm+1}{a}$.

To render $\dfrac{dm+1}{a}$ integral, we put $\dfrac{dm+1}{a}=d(p-1)+c$, where p=any integer, and $c=n$ in the *first multiple* of a that renders m integral in the equation $dm+1=ac$.

When $m=a(p-1)+\dfrac{ac-1}{d}$; or the least value of m is $\dfrac{ac-1}{d}$, and every subsequent value of m is a greater than the value just preceding.

$\therefore\ an=M\left[a(p-1)+\dfrac{ac-1}{d}\right]+1$; the least value being obtained when $p=1$.

Also solved by *JOHN G. KELLAR*, *HARRY S. VANDIVER*, *L. C. WALKER*, *H. C. WHITAKER*, and the *PROPOSER.*

103. Proposed by ELMER SCHUYLER, B. Sc., Professor of German and Mathematics, Boys' High School, Reading, Pa.

Solve, $\log\sin x=\sin\log x$.

Solution by H. C. WHITAKER, A. M., Ph. D., Professor of Mathematics, Manual Training School. Philadelphia, Pa.

1. Suppose that imaginary values are neglected; then $\sin x$ must be positive and therefore x is $2n\pi$ and $(2n+1)\pi$, n being a whole number either positive, negative, or zero.

2 Since $\sin x$ is less than 1, $\log\sin x$ is negative, therefore $\sin\log x$ is also negative and hence $\log x$ is between $(2m+1)\pi$ and $2(m+1)\pi$; taking $m=0$, the limits of x for this condition are e^{π} and $e^{2\pi}$ or 23.146 and 535.5. By the first condition, numbers between 23 and 535.5 when divided by 6.2832 must leave a remainder less than 3.1416; the least positive value of x satisfying both conditions is then found to be between 25.1328 and 26.704. By trial this least positive value of x is found to be 26.208. Another value exists between 26.704 and 28.274 (about 27.4 by trial). Another value between 31.416 and 34.557, and so on, the successive limits for each new value of x being found by adding 6.2832 to the limits already found until 535.5 is reached. After that no real values of x are obtainable until 12392 ($=e^{3\pi}$) is reached; then two more will occur for each increase of 6.2832 until 286751 ($=e^{4\pi}$) is reached—and so on.

In a similar manner, negative values of x may be considered.

Also solved by *G. B. M. ZERR.*